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RESERVE COPY PATENT SPECIFICATION



355,307

Convention Date (Germany): March 22, 1929.
Application Date (in United Kingdom): March 22, 1930. No. 9281/30.
Complete Accepted: Aug. 24, 1931.

COMPLETE SPECIFICATION.

Improvements relating to Winches.

We, DEMAG AKTIENGESellschaft, of Duisburg, Germany, a body corporate organised and existing under the Laws of the German State, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to a winch more especially for use on ships and in warehouses where it is necessary that the winch should be compact in design and simple to operate.

The invention has for its object to provide an electric winch of a design specially suited to the purposes in view and which is capable of effecting the rapid dropping of the load that is necessitated by the conditions under which such a winch is required to operate.

According to the invention an electric winch is provided having a clutch and brake disposed directly behind the motor and in which the clutch and gear brake, which acts alternatively with the clutch without the existence of a free position, are controlled by the axial movement of the motor shaft.

According to the invention, moreover, the clutch can be brought into action while the motor is running only for the purpose of lowering the load.

According to the invention, again, the clutch is advantageously housed in a separate casing disposed between the motor and the gear casing, and the motor is advantageously provided as a motor with an axially movable armature and automatic brake.

A winch according to the invention is illustrated in the accompanying drawings.

Figure 1 shows the winch in elevation.

Figure 2 shows the winch in elevation and partial section.

Figures 3 and 4 represent different methods of operating the motor and the clutch.

The winch shown in Figure 1 is driven by the motor 1, which is connected to the gearing shaft 2 through a clutch 3, 4. On the shaft 2 is mounted on the one hand the brake cone 5 and on the

other hand the pinion 6, which drives the drum 11 or driving pulley 11 through the gear wheels 7, 8, 9 and the shaft 10. The toothed wheel gears are housed in a casing 12, which also carries the flange for the motor and the bearing for the drum 11. The brake cone 5 on the shaft 2 co-operates with a second cone 13 on the drum 11. The clutch 3, 4 is worked by a system of rods 14, 15 which are indicated diagrammatically in the drawing either by hand, mechanically or electrically by a magnet. The way in which the apparatus works is as follows:

It is assumed that a load is to be lifted up to a certain floor. The motor first receives current in the hoisting direction and does so until the load is slightly above the floor of the warehouse. After this the motor is unclutched and reversed. When the motor has attained its full number of revolutions and the swinging load has just swung into the floor, the clutch is operated to bring the gearing into use and the load is rapidly lowered and deposited. The method of procedure is the same when the load is deposited from above downwards, except that the motor has not to be reversed.

The control of the movements above described may be carried out in all kinds of ways. A convenient one is to use an operating rod 20 which extends over the whole height of the warehouse (see Figures 3 and 4) and which is connected to the controller of the motor 21 by a system of rods 22. The rod may be counterbalanced by means of counterweights, so that it is easy to operate. As shown in Figure 3 this rod is movable longitudinally and controls the motor when so moved symmetrically. The clutch between the motor and the gearing, for which in the example illustrated, electrical operation by the electromagnet is provided, is worked by a push button 23, which switches the magnets off and on independently of the particular way in which the operating rod is worked.

As shown in Figure 4 the rod 20 makes in addition to the vertical movement, a rotary movement also, which can be produced by means of the handle 24, whereas

by the vertical movement as described, the controller of the motor is controlled, the rotary movement works the clutch rods mechanically and does so by the well known construction of the system of rods 25, irrespective of the particular position of the controller.

Still other possibilities exist for the working of the motor and the clutch.

- 10 For example firstly the motor and the clutch may be controlled within one range of movement of the operating rod and within another range of movement thereof but by the same direction of movement only the motor alone. In all cases the motor must be capable of being switched on or off separately from the gearing. It is convenient as shown to construct it as a motor with a sliding armature, as then the coupling can be produced in the simplest possible way by the sliding movement of the armature. As soon as the armature is brought into the field, coupling between the motor and the gearing takes place, and at the same time the cone 5 is disconnected from the cone 13. This movement may be prevented by the magnet or the clutch rods system of the clutch 3, 4, which must consequently exert a stronger axial force than the armature of the motor.

The brake power may also be further increased by the use of skew teeth on the toothed wheels of the gearing.

- 35 As a violent jerk would ensue if the running motor were to be suddenly thrown into gear in the hoisting direction, such a coupling must be prevented by well known means.

- 40 In all cases in which the load is not

only rapidly lowered in the manner described, but is also to be lowered in the normal way by working the motor in the descending direction and permanent coupling to the gearing, such a permanent coupling must obviously permit of being effected in addition to the switching off of the rotor masses when accelerating. This is the case in the constructional example shown.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An electric winch with clutch and brake disposed directly behind the motor, characterised in that both the clutch and a gear brake acting alternatively with the clutch without a free position are controlled by the axial movement of the motor shaft.

2. An electric winch according to claim 1, characterised in that the clutch can be brought into action while the motor is running, but only when the load is being lowered.

3. An electric winch according to claim 1, characterised in that the clutch is disposed between the motor and the gear casing.

4. An electric winch according to claim 1, characterised in that the driving motor is constructed as a motor with sliding armature and automatic brake.

Dated this 22nd day of March, 1930.

EDWARD EVANS & Co.,

27, Chancery Lane,
London, W.C.2,

Agents for the Applicants.

Fig.1.

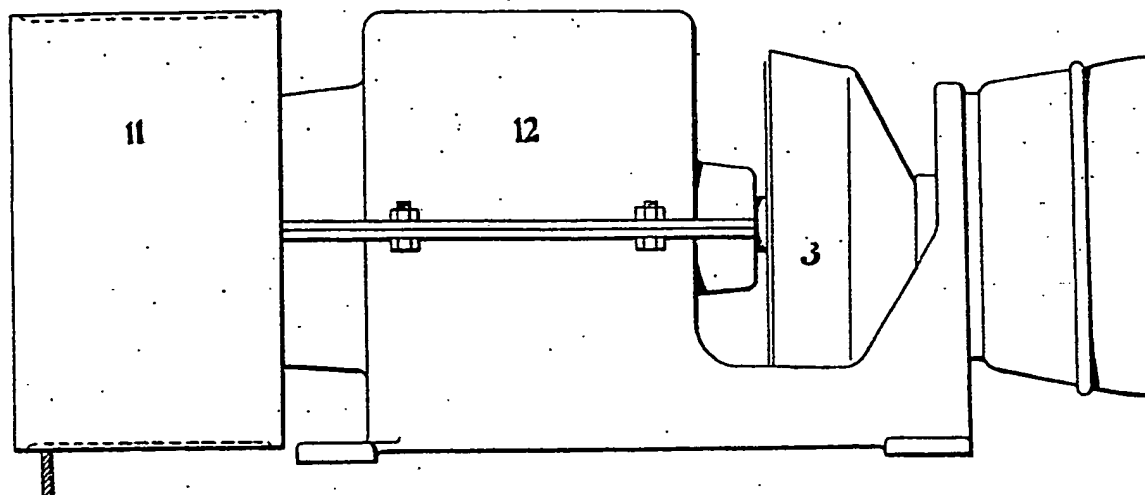
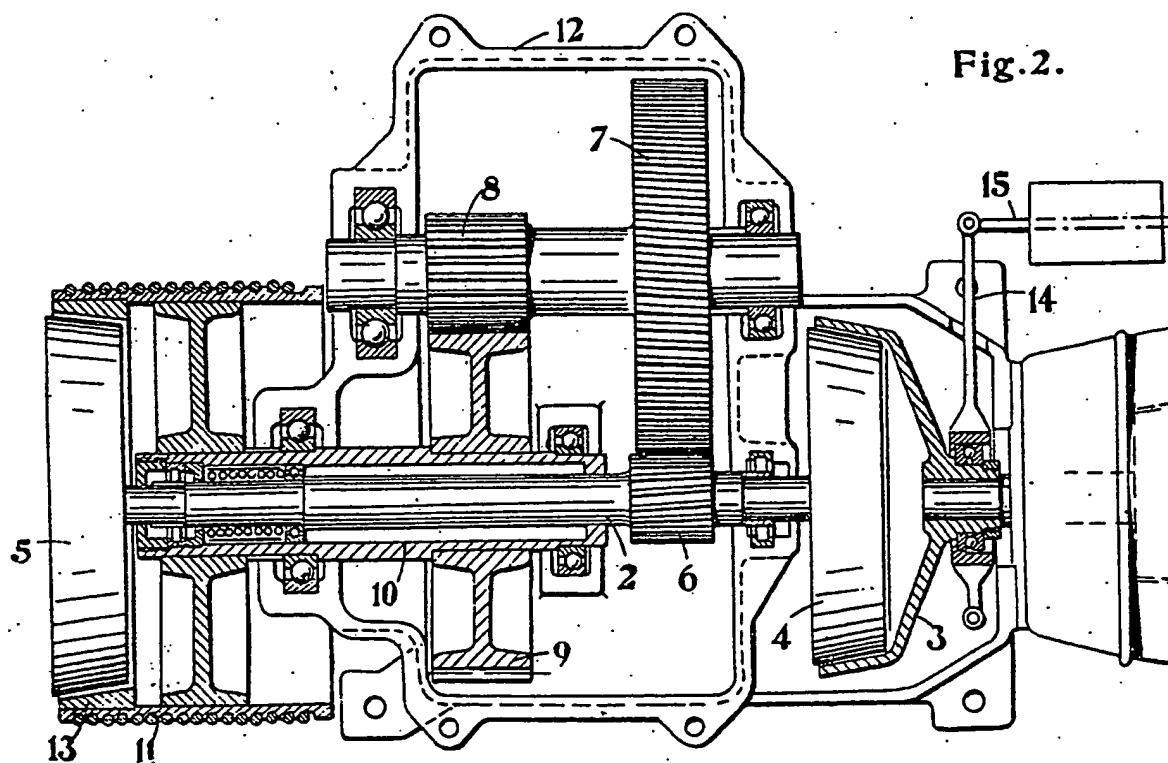


Fig.2.



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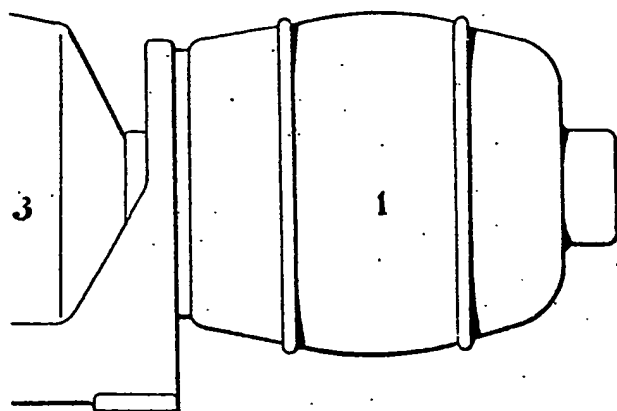


Fig. 2.

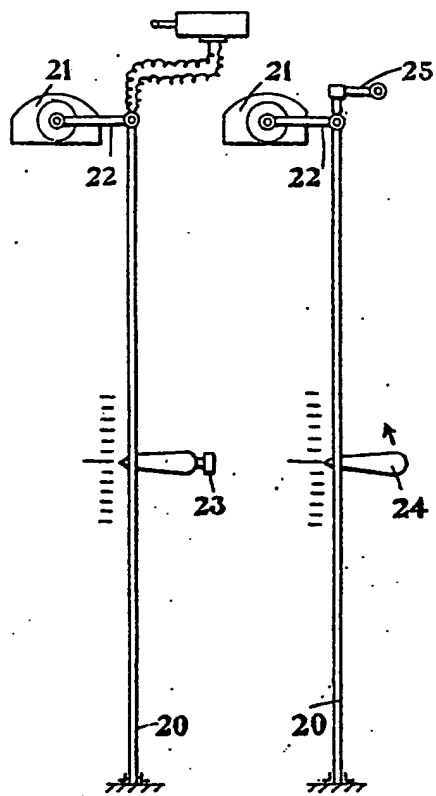
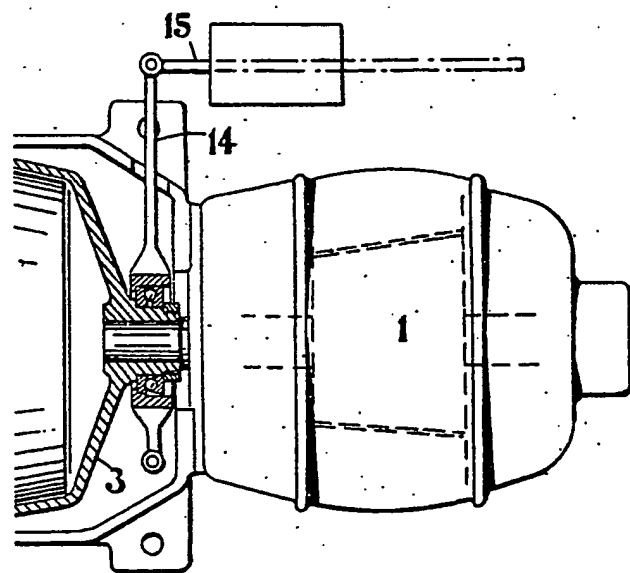


Fig. 3.

Fig. 4.

Fig. 1.

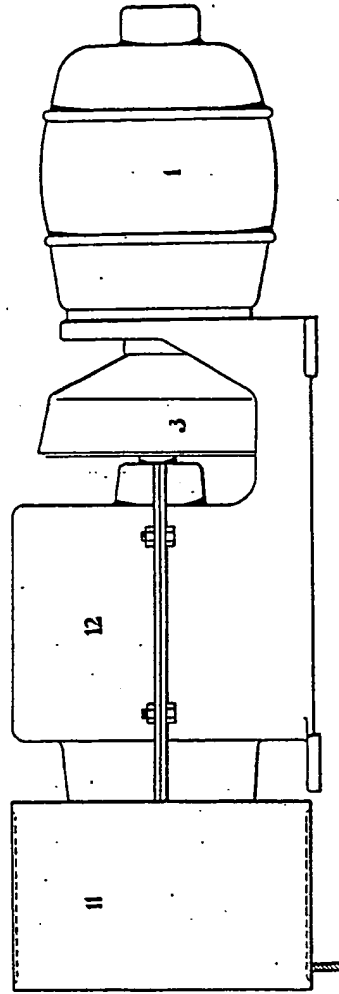


Fig. 2.

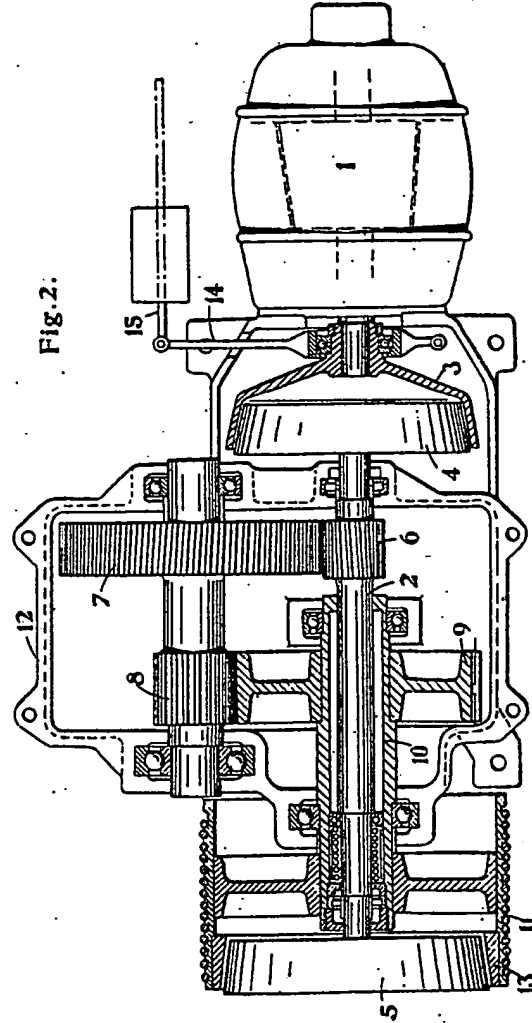


Fig. 4.

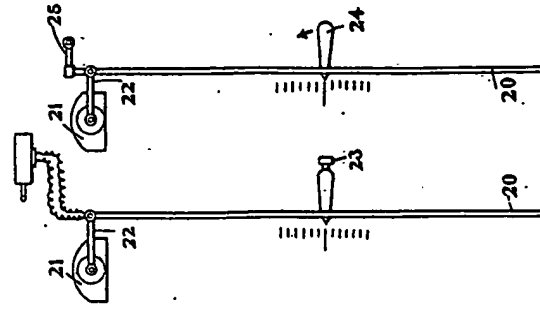
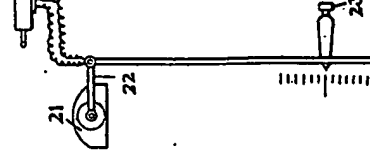


Fig. 3.



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